

What is claimed is:

1. A power supply device incorporated in a vehicle driven by an internal combustion engine comprising:

5 a first power supply system that uses a first generation coil provided in a generator driven by said internal combustion engine for driving a vehicle as a power source to supply DC power to a power supply line that provides a power supply voltage to an electrical load or electrical loads provided in the vehicle;

10 a second power supply system that uses a second generation coil provided in said generator as a power source to supply power to an external load; and

a power supply circuit for assistance that supplies a DC output having a voltage value equal to or close to a rated value of an output voltage of said first power supply system, from said second power supply system to said power supply line, to assist said first power supply system.

2. A power supply device incorporated in a vehicle driven by an internal combustion engine comprising:

20 a first power supply system that uses a first generation coil provided in a generator driven by the internal combustion engine as a power source to supply DC power to a power supply line that provides a power supply voltage to an electrical load or electrical loads provided in the vehicle;

a second power supply system that uses a second generation coil provided in another generator driven by said internal combustion engine as a power source to supply power to an external load; and

25 a power supply circuit for assistance that supplies a DC output having a voltage value equal to or close to a rated value of an output voltage of said first power supply system, from said second power supply system to said power supply line, to assist said first power supply system.

3. A power supply device incorporated in a vehicle driven by an internal combustion engine comprising:

a first power supply system that uses a first generation coil provided in a generator driven by said internal combustion engine as a power source to supply DC power to a power supply line that provides a power supply voltage to an electrical load or electrical loads provided in the vehicle;

a second power supply system having a DC power supply unit that uses a second generation coil provided in said generator as a power source to generate a DC output, and an inverter that converts the output of said DC power supply unit into an AC output at a commercial frequency;

a transfer switch that switches a supply target of an output of said second power supply system, so as to supply the output of said second power supply system across output terminals to which an external load is connected when the external load is driven, and supply power from said second power supply system to said power supply line when said external load is not driven; and

inverter control means for assistance for controlling switch elements that constitute said inverter, so as to operate said inverter as a DC-DC converter when said transfer switch is switched so as to supply the power from said second power supply system to said power supply line, and so as to supply a DC output having a voltage value equal to or close to a rated value of an output voltage of said first power supply system from said second power supply system to said power supply line in order to assist the first power supply system.

4. The power supply device incorporated in a vehicle driven by an internal combustion engine according to claim 3,

wherein said inverter is a bridge type inverter having four switch elements that are connected to form a single-phase bridge, and

said inverter control means for assistance is comprised so as to use a pair of switch elements, among the switch elements that constitute said inverter, as switch elements that constitute the DC-DC converter, said switch elements being to be turned on in order to output, from said inverter, a  
5 voltage having the same polarity as a DC voltage applied across output terminals of said inverter from a side of said power supply line when said first power supply system is assisted, to keep one of said pair of switch elements in an ON state, and to turn on/off the other of said switch elements in a predetermined duty ratio, thereby causing the inverter to output the DC  
10 output having the voltage value equal to or close to the rated value of the output voltage of the first power supply system.

5. A power supply device incorporated in a vehicle driven by an internal combustion engine comprising:

a first power supply system that uses a first generation coil provided in  
15 a generator driven by said internal combustion engine for driving a vehicle as a power source to supply DC power to a power supply line that provides a power supply voltage to an electrical load or electrical loads provided in the vehicle;

a second power supply system having a DC power supply unit that uses  
20 a second generation coil provided in another generator driven by said internal combustion engine as a power source to generate a DC output, and an inverter that converts the output of said DC power supply unit into an AC output at a commercial frequency;

a transfer switch that switches a supply target of an output of said  
25 second power supply system, so as to supply the output of said second power supply system across output terminals to which an external load is connected when the external load is driven, and supply power from said second power supply system to said power supply line when said external load is not

driven; and

inverter control means for assistance for controlling switch elements that constitute said inverter, so as to operate said inverter as a DC-DC converter when said transfer switch is switched so as to supply the power  
5 from said second power supply system to said power supply line, and so as to supply a DC output having a voltage value equal to or close to a rated value of an output voltage of said first power supply system from said second power supply system to said power supply line in order to assist the first power supply system.

10 6. The power supply device incorporated in a vehicle driven by an internal combustion engine according to claim 5,

wherein said inverter is a bridge type inverter having four switch elements that are connected to form a single-phase bridge, and

said inverter control means for assistance is comprised so as to use a  
15 pair of switch elements, among the switch elements that constitute said inverter, as switch elements that constitute the DC-DC converter, said switch elements being to be turned on in order to output, from said inverter, a voltage having the same polarity as a DC voltage applied across output terminals of said inverter from a side of said power supply line when said  
20 first power supply system is assisted, to keep one of said pair of switch elements in an ON state, and to turn on/off the other of said switch elements in a predetermined duty ratio, thereby causing the inverter to output the DC output having the voltage value equal to or close to the rated value of the output voltage of the first power supply system.

25 7. A power supply device incorporated in a vehicle driven by an internal combustion engine comprising:

a first power supply system that uses a first generation coil provided in a generator driven by said internal combustion engine for driving a vehicle as

a power source to supply DC power to a power supply line that provides a power supply voltage to an electrical load or electrical loads provided in the vehicle;

a second power supply system having a DC power supply unit that uses  
5 a second generation coil provided in said generator as a power source to generate a DC output, and an inverter that converts the output of said DC power supply unit into an AC output at a commercial frequency, said DC power supply unit having a voltage adjustment function;

a transfer switch that switches a supply target of the output of said DC  
10 power supply unit so as to supply the output of said DC power supply unit to said inverter when an external load is driven, and so as to supply the power of said DC power supply unit to said power supply line when said external load is not driven; and

voltage adjustment means for assistance for adjusting an output  
15 voltage of said DC power supply unit, so as to supply a DC output having a voltage value equal to or close to a rated value of an output voltage of said first power supply system, from said DC power supply unit to said power supply line, to assist the first power supply system, when said switch is switched so as to supply the power of said DC power supply unit to said  
20 power supply line.

8. A power supply device incorporated in a vehicle driven by an internal combustion engine comprising:

a first power supply system that uses a first generation coil provided in a generator driven by said internal combustion engine for driving a vehicle as  
25 a power source to supply DC power to a power supply line that provides a power supply voltage to an electrical load or electrical loads provided in the vehicle;

a second power supply system having a DC power supply unit that uses

a second generation coil provided in another generator driven by said internal combustion engine as a power source to generate a DC output, and an inverter that converts the output of said DC power supply unit into an AC output at a commercial frequency, said DC power supply unit having a  
5 voltage adjustment function;

a transfer switch that switches a supply target of the output of said DC power supply unit so as to supply the output of said DC power supply unit to said inverter when an external load is driven, and so as to supply the power of said DC power supply unit to said power supply line when said external  
10 load is not driven; and

voltage adjustment means for assistance for adjusting an output voltage of said DC power supply unit, so as to supply a DC output having a voltage value equal to or close to a rated value of an output voltage of said first power supply system, from said DC power supply unit to said power  
15 supply line, to assist the first power supply system, when said transfer switch is switched so as to supply the power of said DC power supply unit to said power supply line.

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